

operators with transmit and receive frequency parameters and maximum and minimum power level and density.¹³⁸ Spacenet asserts that requiring non-routine earth station applicants to serve potentially affected satellite operators is burdensome for earth station applicants and unnecessary given that the public notice process already alerts potentially affected operators to the non-routine earth station.¹³⁹

56. We agree with Spacenet that it is not necessary to require earth station license applicants to serve antenna gain patterns on affected satellite operators. As discussed elsewhere in this Order, we expect the desired (or target) satellite operator(s) to coordinate non-routine earth station operations with other affected satellite operators.¹⁴⁰ Therefore, in most cases, we expect the earth station operator to provide the antenna gain patterns and other relevant technical information to the target satellite operator(s), who can then coordinate with affected satellite operators, *before* the earth station applicant files an application with the Commission.

57. Hughes recommends maintaining a database on the Commission's website for contact information for satellite operators on an orbit location-by-orbit location basis.¹⁴¹ Contact information for satellite operators is already available in satellite license applications that can be downloaded from the IBFS database available on our website.¹⁴² We are in the process of organizing this information in an orbit location-by-orbit location format. In the meantime, all satellite applications and licenses, however, are publicly available, and Hughes and other satellite operators may use this information to establish points of contact on a location-by-location basis should they wish to do so.

58. Finally, Hughes requests us to clarify that the antenna gain patterns in Appendix A of the *Notice* are not intended to limit the size or shape of antennas based on circular aperture.¹⁴³ We do so. The Appendix A antenna gain patterns were included for illustrative purposes only, and were not intended to limit earth station operators' choice of antenna.

b. List of Approved Non-Routine Antennas

59. Spacenet and Hughes recommend establishing a database of approved non-routine antennas.¹⁴⁴ We agree that such a database would help expedite our review of non-routine earth station applications. We also find that a website listing approved non-routine antennas, including antenna gain patterns and the conditions placed on the use of each antenna, would be as helpful as a database would be, and could be implemented more quickly. Accordingly, we direct the

¹³⁸ GE Americom Comments at 6.

¹³⁹ Spacenet Reply at 15.

¹⁴⁰ *See, e.g.*, Section III.E.

¹⁴¹ Hughes Reply at 11.

¹⁴² *See* <<www.fcc.gov>>.

¹⁴³ Hughes Comments at 27.

¹⁴⁴ Hughes Reply at 10-11; Spacenet Comments at 43-44, 46. *See also* GCI Further Comments at 1-3.

International Bureau to establish a List of Approved Non-Routine Antennas on its website, and we delegate authority to the Bureau for this purpose.¹⁴⁵

D. Non-Routine Power Levels

60. *Background.* In addition to antenna size, earth stations may be considered as "non-routine" due to their transmitting power, regardless of size. In this Section, we adopt our proposal to streamline the process for earth station applications proposing higher-than-routine power levels by adopting a certification procedure similar to the certification procedure we adopted above for earth stations proposing smaller-than-routine antennas.

61. In the *Notice*, the Commission explained that its two-degree spacing rules establish power limits for fixed-satellite earth stations.¹⁴⁶ Earth station applicants are not prohibited from seeking authority to operate at higher power levels, but the Commission staff reviews those applications on a case-by-case basis rather than processing them routinely.¹⁴⁷ The Commission also noted that Section 25.134 of its rules¹⁴⁸ requires earth station applicants seeking a VSAT license to submit an ASIA if they plan to operate at non-routine power levels.¹⁴⁹ In the case of other types of earth stations, the rules do not explicitly set forth any procedure for demonstrating that a higher power level will not cause unacceptable or harmful interference in a particular case. As a result, applicants requesting authority to operate at power levels higher than those specified in those rules often submit an ASIA.¹⁵⁰

62. The *Notice* sought comment on replacing the ASIA requirement for non-routine power levels with a self-certification process.¹⁵¹ Under this proposal, an earth station applicant would provide, as exhibits to its application, certifications of its own and from the operator of each satellite with which the non-routine earth station power and power density levels will be communicating.¹⁵² The earth station operator would be authorized to use the non-routine power and power density levels only with those satellites for which certifications are provided.¹⁵³ Thus,

¹⁴⁵ In 1999, the Commission announced an intention to consider developing a "type acceptance" program for satellite earth station equipment. See Commission Launches Earth Station Streamlining Initiative, *Public Notice*, DA 99-1259 (released June 25, 1999). This List of Approved Non-Routine Antennas will serve the same purpose of a type acceptance program with respect to non-routine antennas.

¹⁴⁶ *Notice*, 15 FCC Rcd at 25140 (para. 31), citing 47 C.F.R. §§ 25.134 (VSAT networks), 25.211 (video transmissions), 25.212 (narrowband transmissions).

¹⁴⁷ *Notice*, 15 FCC Rcd at 25140 (para. 31).

¹⁴⁸ 47 C.F.R. §25.134.

¹⁴⁹ *Notice*, 15 FCC Rcd at 25140 (para. 31), citing 47 C.F.R. §25.134(b).

¹⁵⁰ *Notice*, 15 FCC Rcd at 25140 (para. 31).

¹⁵¹ *Notice*, 15 FCC Rcd at 25140 (para. 32).

¹⁵² *Notice*, 15 FCC Rcd at 25140 (para. 32).

¹⁵³ *Notice*, 15 FCC Rcd at 25140 (para. 32).

earth station applicants using this procedure would not be eligible for an ALSAT earth station license. In the *Notice*, the Commission contemplated requiring the same information in certifications regarding power-level coordination as it proposed for smaller-than-routine antenna size coordination. Specifically, these certifications should show that the target satellite operator has coordinated the proposed earth station operations with affected satellite systems and terrestrial systems, and that the satellite operator will take the earth station into account when negotiating future coordination agreements.¹⁵⁴

63. *Discussion.* PanAmSat opposes allowing earth station applicants proposing non-routine power levels to self-certify that their operations are consistent with existing or new coordination agreements. According to PanAmSat, those earth station applicants face a conflict of interest because they have an incentive to interpret coordination agreements more liberally than an adjacent satellite operator would.¹⁵⁵ PanAmSat also states that allowing earth station applicants to submit a self-certification rather than an interference analysis deprives adjacent satellite operators of the opportunity to review the applicant's analysis. PanAmSat claims that expecting adjacent satellite operators to monitor non-routine earth station applications and conduct their own interference analyses places an unreasonable burden on those satellite operators.¹⁵⁶ Spacenet disagrees that a self-certification process would be unworkable.¹⁵⁷

64. We do not believe that earth station operators using non-routine power levels would face a conflict of interest. The procedure set forth in the *Notice* requires the operator of the satellite communicating with the non-routine earth station (the "target" satellite) to coordinate the non-routine power levels with operators of potentially affected satellites within 6°, and to certify that coordination has been completed. We will dismiss earth station applications requesting authority to operate at non-routine power levels unless this certification is included with the application. We have always relied on satellite operators to comply with the coordination agreements they make with each other, and we see no reason why we cannot continue do to so in this context. Furthermore, potentially affected satellite operators have an opportunity to comment on the earth station application, and to explain their specific concerns regarding the proposed antenna, as set forth below. Accordingly, we adopt our proposal for non-routine power levels.

65. SIA supports allowing earth station operators to attempt to coordinate a higher-than-routine EIRP density, but only if the proposed EIRP density is limited to 13 dBW/4 kHz.¹⁵⁸ However, if a non-routine earth station operator can successfully coordinate its operations with an EIRP density greater than 13 dBW/4 kHz, then we see no reason to preclude the earth station from operating at that power level with the particular target satellite that has been coordinated. Accordingly, we will not place a limit on coordinated EIRP density.

¹⁵⁴ Compare *Notice*, 15 FCC Rcd at 25140 (para. 32) (power certifications) with *Notice*, 15 FCC Rcd at 25136-37 (para. 21) (antenna size certifications). See also *Notice*, 15 FCC Rcd at 25188-89 (App. B, proposed Sections 25.220(d)(1) and (e)(1).)

¹⁵⁵ PanAmSat Comments at 6-7.

¹⁵⁶ PanAmSat Comments at 7.

¹⁵⁷ Spacenet Reply at 13-14.

¹⁵⁸ SIA Further Comments at 25-26.

E. Satellite Coordination Negotiations to Reflect Non-Routine Antennas and Power Levels

1. Background

66. Above, we adopted a certification procedure for earth station applications proposing smaller-than-routine earth station antennas and higher-than-routine power levels. Under both of these certification procedures, we expect coordination to be completed, and any objections raised by adjacent satellite operators to be resolved, prior to the time the earth station application is filed. However, the *Notice* also invited comment on establishing an additional procedure to provide an opportunity for additional coordination negotiations after the non-routine earth station application is filed.¹⁵⁹ We intended this procedure to be a backstop mechanism to ensure that the satellite operator has not mistakenly overlooked any potentially affected satellite operator, including those where a satellite is located more than six degrees away from the target satellite.

67. Under our proposal, we would place non-routine earth station applications on Public Notice identifying the applicant's proposed frequency bands, antenna diameters, and power and power density for each antenna, and the satellite or satellites that the applicant intends to use.¹⁶⁰ We also proposed allowing 30 days for comment.¹⁶¹ In addition, we solicited comment on whether we should afford operators of any potentially affected satellite, including satellites more than six degrees away from the target satellite, an additional 60 days after the comment deadline to resolve coordination issues that may be identified in the 30-day comment period.¹⁶² After the 60-day deadline, the Commission proposed to authorize the earth station to communicate at its requested higher power levels with all satellites for which it has submitted certifications, and for which it has received no indication that there are any unresolved issues.¹⁶³ The Commission would not authorize the earth station to communicate with satellites for which there are unresolved issues. We adopt this proposal as discussed below.

2. Post-Filing Coordination

68. PanAmSat and Hughes object to this additional coordination period, arguing that coordination issues with adjacent satellite operators should be resolved before the non-routine earth station operator files its application.¹⁶⁴ We agree. Consequently, we expect that, in the vast majority of cases, no objections will be filed during the 30-day comment period, and we will be in a position to grant the non-routine application. Nevertheless, we envision that the target satellite operator may occasionally overlook a potentially affected satellite,¹⁶⁵ and that there may

¹⁵⁹ *Notice*, 15 FCC Rcd at 25141 (para. 34).

¹⁶⁰ *Notice*, 15 FCC Rcd at 25141 (para. 35).

¹⁶¹ *Notice*, 15 FCC Rcd at 25141 (para. 35).

¹⁶² *Notice*, 15 FCC Rcd at 25141 (para. 35).

¹⁶³ *Notice*, 15 FCC Rcd at 25141 (para. 35).

¹⁶⁴ PanAmSat Comments at 8; Hughes Reply at 10.

¹⁶⁵ By "potentially affected satellites," we mean satellites that lie in the direction of a side lobe that exceeds the antenna gain pattern envelope.

be cases in which a potentially affected satellite is located more than 6° away from the target satellite. Thus, the Public Notice and additional coordination procedure provide needed assurance that all potentially affected parties have agreed to the non-routine operations. We revise Sections 25.220(a)(4) and 25.154(e) in Appendix B of this Order to make this procedure clear.

69. Similarly, Loral recommends requiring that coordinations with U.S.-licensed satellite operators be completed before the earth station application is filed, but maintains that more time should be allowed to complete coordination negotiations with non-U.S.-licensed satellite operators.¹⁶⁶ We see no reason to adopt different rules for coordination negotiations with non-U.S.-licensed satellite operators and for negotiations with U.S.-licensed satellite operators. We will permit an additional 60-day coordination period for *all* parties not adequately consulted prior to the application being filed.¹⁶⁷

3. Modification or Clarification of Requirements

a. Thirty-day Public Notice Period

70. WorldCom requests that we grant unopposed applications after the 30-day public notice period, without waiting for the 60-day coordination period to pass.¹⁶⁸ Spacenet argues that any space station operator that does not respond within this 30-day period should be constructively considered to have consented to the non-routine earth station operations.¹⁶⁹ Telesat opposes licensing non-conforming earth stations if no potentially affected satellite operator objects within 30 days. Telesat argues that the onus should be on the non-conforming earth station operator rather than other satellite operators. Telesat claims that non-U.S.-satellite operators may not monitor Commission public notices.¹⁷⁰

71. We will act on unopposed non-routine earth station applications at the end of the 30-day Public Notice period. This post-public notice coordination procedure should be a backstop mechanism to ensure that the non-routine operations have been coordinated with all potentially affected satellite operators. In all but rare instances, we expect that these coordination negotiations will be completed prior to the filing of the earth station application, including coordination with non-U.S.-licensed satellite operators. With respect to Telesat's concerns, we expect the target satellite operator to be aware of all potentially affected operators, including non-U.S. operators. Moreover, all U.S. satellites must be coordinated with non-U.S. satellites under procedures established by the ITU. If a U.S. satellite operates outside of a coordination

¹⁶⁶ Loral Comments at 8-9.

¹⁶⁷ PanAmSat opposes this proposal, claiming that non-routine earth station operators do not have as much incentive as adjacent satellite operators to prevent adjacent satellite interference, and so may construe existing or new coordination agreements more liberally than adjacent satellite operators do. PanAmSat Comments at 8; PanAmSat Reply at 2. This argument is substantially similar to PanAmSat's objections to the certification procedures we adopt above. We reject PanAmSat's arguments, for the same reasons that we rejected those arguments above.

¹⁶⁸ WorldCom Comments at 4.

¹⁶⁹ Spacenet Reply at 15-16. *See also* 47 C.F.R. §§ 25.203(c)(3), 101.103(d).

¹⁷⁰ Telesat Comments at 2-3.

agreement and causes harmful interference, it is in violation of U.S. treaty obligations. In that case, the interfering transmissions must be terminated immediately. Further, the Commission can initiate an enforcement action against a licensee that certified that its operations had been coordinated with all potentially affected parties within 6° of the target satellite when it had not.¹⁷¹ Thus, we see no reason to treat U.S. and non-U.S. operators differently. Accordingly, if no comments are filed at the end of the 30-day public notice period, we see no reason to delay action on the earth station application.

72. WorldCom requests that we clarify that we will consider oppositions filed by parties other than satellite operators.¹⁷² We will not preclude any party from raising concerns about non-routine earth station applications. In particular, terrestrial wireless operators are free to raise issues regarding non-routine earth stations operating in shared bands.

73. Loral argues that the 60-day coordination period should be triggered by an informal notification by any interested party that negotiations are ongoing, rather than requiring a formal comment or petition.¹⁷³ We disagree. As we explain further below, we do not intend to deny a non-routine earth station application on the basis of a frivolous opposition. Therefore, commenters seeking to initiate this 60-day coordination process should provide some explanation on the nature of the coordination issue it is raising. This "formal" comment or petition does not need to be a lengthy document, but it should provide enough detail to show that the commenter's objection is not frivolous.

b. Details of Coordination Negotiations

74. GE Americom opposes any time limit for resolution of coordination issues with potentially affected satellite operators, asserting that this time limit might interfere with satellite operators' ability to protect their customers from interference.¹⁷⁴ We disagree. First, we expect the coordination negotiations between the target satellite operator and potentially affected satellite operators to be completed before the non-routine earth station application is filed. Second, adjacent satellite operators are given an additional opportunity to voice concerns during the 30-day Public Notice period and to attempt to resolve those concerns during the 60-day coordination period. Finally, if a non-frivolous objection is not adequately resolved, we will not authorize the non-routine earth station to communicate with the target satellite at issue at the power levels proposed in the earth station application. Rather, we will grant the application at the coordinated powers and the coordinated satellites only.¹⁷⁵

¹⁷¹ See 47 C.F.R. § 1.17 (requiring license applicants to make truthful and accurate statements in Commission submissions).

¹⁷² WorldCom Comments at 4.

¹⁷³ Loral Petition at 8.

¹⁷⁴ GE Americom Comments at 7.

¹⁷⁵ In cases where the earth station applicant proposes to use a routine antenna, but a higher-than-routine power level, and the applicant does not coordinate the higher power level, the Commission can authorize the applicant to operate at a routine power level.

75. GE Americom maintains that non-routine earth station operators should bear the burden of providing target space station operators and potentially affected space station operators with technical information and of working with space station operators to resolve coordination issues.¹⁷⁶ Non-routine earth station operators already have a strong incentive to provide their target satellite operators with the information needed to complete coordination negotiations with other affected satellite operators. Without that information, the satellite operators will not be able to reach agreement, and we will not be able to grant the earth station application as requested. Therefore, we do not find it necessary at this time to require that earth station applicants provide any more information to satellite operators than is already required in their earth station applications to the Commission.¹⁷⁷

76. WorldCom requests that the Commission take some measure to ensure that coordination issues are resolved in a timely manner, although WorldCom does not have any specific recommendation.¹⁷⁸ We find that establishing a timetable for the negotiations should ensure that coordination issues are resolved in a timely manner as WorldCom requests. Accordingly, we decline to adopt any additional measures at this time. Any such measures would probably involve the Commission intervening in the coordination negotiations. We have no basis for concluding whether or under what circumstances such Commission intervention would be appropriate.

c. Conclusion of Coordination Negotiations

77. Loral recommends that we grant earth stations authority to communicate with all space stations with whom the coordination issues have been resolved at the end of the 60-day coordination period, and requests that we clarify that we will not grant authority to communicate with satellites for which coordination issues remain unresolved.¹⁷⁹ We will grant earth station applications in part with respect to those space stations with which the coordination issues have been resolved at the end of the 60-day period. In other words, in cases where a non-routine earth station applicant requests authority to communicate with two or more specific target satellites, and some but not all of those target satellite operators have reached agreements with its neighboring satellite operators regarding the non-routine earth station, we will authorize the earth station operator to communicate only with the target satellite operators that have reached agreements with all their neighbors. There is no reason to deny those applications with respect to a target satellite once the issues related to that target satellite has been resolved. We cannot state categorically that we will deny all non-routine earth station applications with respect to those space stations with which the coordination issues remain outstanding. We reserve the authority to grant a non-routine earth station in the public interest, with conditions if necessary, in spite of an unresolved comment or petition to deny, in the unlikely case that a petitioner files a frivolous petition to deny.

¹⁷⁶ GE Americom Comments at 7.

¹⁷⁷ Non-routine earth station applicants are free to provide such technical information to adjacent satellite operators on a voluntary basis, however, particularly in cases where they believe that providing this information might expedite the coordination process.

¹⁷⁸ WorldCom Comments at 4.

¹⁷⁹ Loral Comments at 9-10.

78. WorldCom suggests that we adopt a streamlined procedure for adding satellites to a non-routine earth station license if the coordination issues are resolved after the 60-day period, or to treat such additions as minor modifications.¹⁸⁰ We will not do so. Earth station operators may make minor modifications without prior Commission authorization and without public notice.¹⁸¹ In cases where the coordination issues raised by communications with a particular satellite are so complicated that they cannot be resolved in the 60-day coordination period, it would be unreasonable to enable an earth station operator to add that satellite to its license without allowing an opportunity for all operators of potentially affected by communications to the new satellite. Therefore, we will consider each new satellite point of communication as a major modification. We revise our rules to make this clear.

79. Spacenet recommends establishing a 10-day period after the end of the 60-day coordination period, in which earth station applications would be deemed granted without any further action by the Commission unless the Commission states otherwise.¹⁸² We will not adopt Spacenet's recommendation at this time. Instead, we adopt a goal of issuing such earth station licenses within an average of 10 business days after at the end of the of the 60-day coordination period.¹⁸³ This will allow us to include on the license any conditions specific to the non-routine earth station operations while still granting authority in an expedited manner.

F. Public Notice Language

80. The *Notice* invited comment on requiring non-routine earth station applicants to submit the information below as an "informative" as an attachment to the application. While much of this information appears elsewhere in the application, we invited comment on providing this information in a uniform format to streamline and expedite the placement of non-routine earth station applications on public notice.¹⁸⁴

¹⁸⁰ WorldCom Comments at 4.

¹⁸¹ See 47 C.F.R. § 25.118.

¹⁸² Spacenet Comments at 43.

¹⁸³ For the definition of "business day," see 47 C.F.R. § 1.4(e)(2).

¹⁸⁴ *Notice*, 15 FCC Rcd at 25142 (paras. 37-38).

- A detailed description of the service to be provided, including frequency bands and satellites to be used.
- The diameter of the antenna.
- Proposed power and power density levels.
- Identification of any random access technique, such as the Aloha multiple access technique, if applicable.¹⁸⁵
- Identification of any rule or rules for which a waiver is requested.

The Commission explained that it was trying to achieve a reasonable balance between limiting administrative burdens on earth station applicants, expediting the licensing process, and enabling interested parties to make informed decisions about whether they should file petitions to deny the application.¹⁸⁶

81. PanAmSat and Spacenet support this proposal, and PanAmSat recommends that we generate a public notice automatically.¹⁸⁷ PanAmSat suggests requiring the following information for inclusion in the public notice: (a) antenna gain and cross-polarization information; (b) the eastern and western boundaries of the arc the applicant is seeking to coordinate; and (c) the modulation scheme for any random access technique.¹⁸⁸ Spacenet opposes requiring the modulation scheme for any random access technique because it may be proprietary.¹⁸⁹ Spacenet also maintains that antenna gain and cross-polarization information requires several pages of charts, and would be difficult to incorporate into a public notice.¹⁹⁰

82. We adopt our proposal to require earth station applicants to submit specific information as an attachment to the application that can be easily incorporated into a public notice.¹⁹¹ In addition, to clarify the scope of potentially affected satellite operators, we will

¹⁸⁵ Random access techniques are used in VSAT networks, which, as noted above, are generally comprised of a hub station that transmits to a satellite and to multiple technically identical remote small aperture antennas which receive transmissions from the satellite and provide return transmissions to the hub earth station. A random access technique is a method of controlling traffic within a VSAT network. The Commission discusses random access techniques in detail in the *Notice* and *Further Notice*. See *Notice*, 15 FCC Rcd at 25145-46 (paras. 50-51); *Further Notice*, 17 FCC Rcd at 18613-14 (paras. 74-75). See also Petition of Spacenet, Inc. for a Declaratory Ruling that Section 25.134 of the Commission's Rules Permits VSAT Remote Stations in the Fixed Satellite Service to Use Network Access Schemes that Allow Statistically Infrequent Overlapping Transmissions of Short Duration, or, in the Alternative, For Rulemaking to Amend that Section, *Order*, 15 FCC Rcd 23712 (Int'l Bur., 2000).

¹⁸⁶ *Notice*, 15 FCC Rcd at 25142 (para. 38).

¹⁸⁷ PanAmSat Comments at 8-9; Spacenet Comments at 44; Spacenet Reply at 20. See also SIA Reply at 5.

¹⁸⁸ PanAmSat Comments at 9. See also SIA Reply at 5.

¹⁸⁹ Spacenet Reply at 20 n.33.

¹⁹⁰ Spacenet Reply at 21.

¹⁹¹ *Notice*, 15 FCC Rcd at 25142 (para. 38), 25178 (App. B, proposed Section 25.130(a)).

require applicants to identify the specific satellites with which they plan to communicate, as PanAmSat suggests.

83. We do not adopt PanAmSat's other suggestions for additional information. We agree with Spacenet that including antenna gain patterns in public notices would delay public notices. In addition, it is not necessary to include that information in public notices because the earth station operator should provide all information needed by the target space station operator to complete coordination, including the gain pattern of any proposed antenna with a non-routine antenna gain pattern. Moreover, the Commission now requires all earth station applications to be filed electronically,¹⁹² and so the information in earth station license applications, including the antenna gain pattern, is readily available through IBFS, the International Bureau's electronic filing system.

G. Conclusion

84. In this Section, and in Section 25.220 of our rules as set forth in Appendix B, we adopt streamlined procedures for considering non-routine earth station applications. An applicant can seek authorization for earth stations with smaller-than-routine antennas under one of two procedural options to demonstrate that it will not cause adjacent satellite interference. It can either (1) reduce the power into its non-compliant antenna, or (2) obtain certifications from the operators satellites with which the earth station operator plans to communicate, showing that those satellite operators have coordinated with the operators of satellites located within six degrees of the target satellite, and that those other potentially affected satellite operators do not oppose the non-compliant operations. These certifications should be filed with the application. Earth station operators that reduce their power levels are eligible to be protected from receiving harmful interference only to the extent that harmful interference would not be caused to an earth station employing an antenna conforming to the antenna gain patterns in the Commission's rules.¹⁹³ Earth station operators that provide certifications will be authorized to operate only with the satellites whose operators provided certifications from the operators of their neighboring satellites, and will be protected from receiving interference from those satellites respectively.

85. We also adopt a procedure for applicants to operate earth stations at non-routine power levels. This procedure is identical to the certification procedure for earth stations with smaller-than-routine antennas, described above.

86. Under both procedures, we will place the application on 30 days public notice, to be followed by a 60-day timetable for coordination negotiations between satellite operators if any comments are filed in response to the application. If non-routine earth station operations are not coordinated with the satellites neighboring a target satellite at the end of the 60-day period, we will not authorize the earth station to communicate with that satellite. In addition to this 30-day public notice and 60-day coordination requirement, all parties filing non-routine earth station applications must provide information for an "informative," as an attachment to the earth station application, to be placed in the public notice, as discussed above.¹⁹⁴

¹⁹² *Third Report and Order*, 18 FCC Rcd at 13508-09 (paras. 64-67) (mandatory electronic filing for routine earth station applications); *Fourth Report and Order*, 19 FCC Rcd at 7421-22 (paras. 3-6) (mandatory electronic filing for all earth station applications).

¹⁹³ *See* 47 C.F.R. § 25.209(c).

¹⁹⁴ Section III.F. above.

87. We expect that these procedures will cover the vast majority of non-routine applications. However, it is possible that a non-routine earth station applicant's target space station operator is unable to obtain certifications from its adjacent satellite operators, but can operate interference-free in a two-degree-spacing environment without reducing its power. In that unlikely event, the earth station license applicant may file a petition for waiver of the Section 25.220 procedures. We would consider granting that waiver request and license application if the applicant can demonstrate "good cause" for that request.¹⁹⁵ The applicant is permitted, but not required, to submit an ASIA as part of its showing.

IV. RELAXATION OF CURRENT REQUIREMENTS

A. Background

88. In addition to establishing a streamlined procedure for non-routine earth station applications, the Commission invited comment on relaxing other earth station licensing requirements. Thus, the Commission proposed measures to facilitate a number of earth station applications, as well as the non-routine applications fundamental to the development of satellite-based broadband Internet access. We address these issues below.

B. Earth Station Power and Power Density Limits

1. Background

89. One of the primary measures we use to prevent harmful interference in a 2° spacing environment is to limit earth station power and power density. This includes both downlink transmissions from the satellite into the earth station and uplink transmissions from the earth station to the satellite. In the *Notice*, we invited comment on increasing the earth station power level limits contained in Sections 25.134, 25.211, and 25.212.¹⁹⁶ We observed that, over the years, we have decreased the size of earth station antennas eligible for routine processing, but we have not reexamined the power spectral density requirements from the earth station, even though a smaller earth station antenna may require higher input power.¹⁹⁷ Accordingly, we invited parties to propose new power limits that reflect technological advances and smaller antennas. We requested commenters to demonstrate that their proposed power levels would protect existing and future users from receiving and causing harmful or unacceptable interference to or from adjacent satellite networks.¹⁹⁸

¹⁹⁵ 47 C.F.R. § 1.3. For more on the meaning of "good cause" within the meaning of Section 1.3, see *WAIT Radio v. FCC*, 418 F.2d 1153, 1159 (D.C. Cir. 1969), *Northeast Cellular Telephone Co. v. FCC*, 897 F.2d 1164, 1166 (D.C. Cir. 1990).

¹⁹⁶ 47 C.F.R. §§ 25.134, 25.211, 25.212; *Notice*, 15 FCC Rcd at 25142-43 (paras. 39-40).

¹⁹⁷ *Notice*, 15 FCC Rcd at 25142-43 (paras. 39-40). Decreasing antenna size decreases mainbeam antenna gain. Therefore, more power into the antenna (transmitter power for the uplink or received power from the satellite downlink) may be required to achieve the same link budget to complete the satellite communication link. *Notice*, 15 FCC Rcd at 25142-43 (para. 40).

¹⁹⁸ *Notice*, 15 FCC Rcd at 25142-43 (para. 40). "Adjacent" in this context means adjacent orbit locations in the geostationary satellite orbit.

2. Satellite Downlink Power Levels

a. Ku-band VSAT Systems

90. *Background.* In response to the Commission's proposals in the *Notice*, many commenters proposed increasing the downlink equivalent isotropically radiated power (EIRP)¹⁹⁹ limits applicable to Ku-band VSAT networks. VSAT networks are generally comprised of a hub station that transmits to a satellite and to multiple technically identical remote small aperture antennas which receive transmissions from the satellite and provide return transmissions to the hub earth station.²⁰⁰ The current EIRP limits are 6 dBW/4 kHz for most VSAT networks and 13 dBW/4 kHz for narrowband analog hub-type networks.

91. Hughes asserts that satellite downlink EIRP spectral densities for Ku-band VSAT systems are too low for the smaller earth station antenna sizes currently in use. Hughes recommends increasing the EIRP density limit for outbound digital carrier transmissions (*i.e.*, transmissions from the hub to the satellite, and then to the remote earth stations), other than single-carrier full transponder and dual-carrier full transponder transmissions, from 6 dBW/4kHz to 9 dBW/4kHz. Hughes maintains that this EIRP density increase will not cause harmful interference to existing systems, based on its analysis of typical VSAT link budgets, noise budgets, and carrier-to-noise ratios.²⁰¹ SIA and Loral support this increase.²⁰² Loral, however, contends that any further relaxation of power limits may eliminate too much of satellite operators' impairment budgets, and so would decrease their ability to accommodate any new non-routine earth stations.²⁰³ Loral requests that we consider carefully and thoroughly any proposals to relax other power limits.²⁰⁴

¹⁹⁹ Equivalent Isotropically Radiated Power (EIRP) is the product of the gain of the antenna in a given direction and the power supplied to that antenna. 47 C.F.R. § 2.1.

²⁰⁰ *Further Notice*, 17 FCC Rcd at 18590 (para. 7); *Notice*, 15 FCC Rcd at 25145 (para. 50), Routine Licensing of Large Networks of Small Antenna Earth Stations Operating in the 12/14 GHz Frequency Bands, 51 Fed. Reg. 15067 (Apr. 22, 1986) (*1986 VSAT Order*).

²⁰¹ Hughes Comments at 15-16 and App. A; Hughes Reply at 6-7.

²⁰² SIA December 10, 2001 *Ex Parte* Statement at 11-15; SIA Further Comments at 25-26; Loral Comments at 10-11.

²⁰³ Loral Comments at 10-11.

²⁰⁴ Loral Comments at 11. Spacenet also supports increasing the narrowband downlink power limit from 6 dBW/4kHz to 9 dBW/4kHz. Spacenet asserts that the power increase will, in part, compensate for increases in interference to VSAT networks it claims will result when satellite systems operating in non-geostationary satellite orbit (NGSO) are introduced in the Ku-band, which is now used by GSO satellite systems, pursuant to the *Ku-band NGSO Order*. Spacenet Comments at 30-34 and Exhibits B and C, *citing* Amendment of Parts 2 and 25 of the Commission's Rules to Permit Operation of NGSO FSS Systems Co-Frequency with GSO and Terrestrial Systems in the Ku-Band Frequency Range, *First Report and Order and Further Notice of Proposed Rulemaking*, ET Docket No. 98-206, 16 FCC Rcd 4096 (2000) (*Ku-band NGSO Order*). The Commission addressed downlink power flux density issues related to GSO/NGSO sharing in the *Ku-band NGSO Order*, and concluded that the rules it adopted in that Order were adequate to protect GSO FSS operations. *See Ku-band NGSO Order*, 16 FCC Rcd at 4128 (paras. 72-73). Therefore, we do not rely on Spacenet's comments in increasing this power limit.

92. PanAmSat asserts that we should raise the "routine" EIRP level even higher than 9 dBW/4kHz. It maintains that an increase of 4 dB, to 10 dBW/4 kHz, in the maximum permitted downlink EIRP spectral density for Ku-band VSAT systems would result in a degradation of the composite carrier to noise plus interference (C/N+I) ratio²⁰⁵ of about 0.7 dB, assuming a 6.1-meter hub earth station antenna, 1.2-meter remote earth station antennas, and two-degree orbital spacing between co-coverage satellite networks. PanAmSat asserts further that an increase in downlink EIRP spectral density of 6 dB, *i.e.*, to 12 dBW/4 kHz, would result in a degradation of the composite C/N+I ratio of about 1.3 dB under the same assumptions. PanAmSat maintains that most link budgets have a 1 dB margin, and so a higher EIRP downlink density can be tolerated.²⁰⁶ In other words, PanAmSat asserts that all earth stations currently in operation could increase their power to 10 dBW/4 kHz without causing harmful interference into each others' systems. Hughes responds that increasing the power level to 10 dBW/4kHz or higher, as proposed by PanAmSat, would create unacceptable levels of interference.²⁰⁷

93. *Discussion.* We agree with PanAmSat that we can increase the downlink EIRP spectral density limit for Ku-band VSAT systems from 6 dBW/4kHz to 10 dBW/4kHz without increasing the potential for harmful or unacceptable interference in any significant way. In making this finding, we reviewed the data we considered when we adopted the 6 dBW/4kHz limit in 1986²⁰⁸ to determine what kinds of systems would have been impacted by allowing higher downlink EIRP density limits at that time. We also determined whether those kinds of systems remain in operation and still require protection from interference. We discuss our analysis in detail in Appendix C to this Order.

94. We find that the only kinds of systems likely to be adversely affected by increasing the downlink EIRP density limit for Ku-band VSAT systems from 6 dBW/4kHz to 10 dBW/4kHz are analog narrowband hub-type systems.²⁰⁹ To compensate for the potential interference that these systems might otherwise experience from the VSAT downlink EIRP density increase we adopt here, we will also allow analog narrowband hub-type systems to increase their power by 4

²⁰⁵ The C/(N+I) ratio is the ratio of carrier power to the total power of all noise and interference sources. It is a measure of the susceptibility of the radio link to all degradations, both natural and man-made. It includes all identifiable sources of noise and interference such as thermal noise, rain fades, and both internal and external interference. It is generally presented as the final result of a "link budget" that systematically lists all such degradations.

²⁰⁶ PanAmSat Comments at 9-10.

²⁰⁷ Hughes Reply at 8.

²⁰⁸ Routine Licensing of Large Networks of Small Antenna Earth Stations Operating in the 12/14 GHz Frequency Bands, *Declaratory Order*, 1986 WL 291567 (F.C.C.) (Com. Car. Bur., released Apr. 9, 1986) at para. 13, *summarized at* 51 Fed. Reg. 15067 (Apr. 22, 1986) (*1986 VSAT Order*).

²⁰⁹ Narrowband analog hub-type systems are single-channel-per-carrier (SCPC) systems used primarily to distribute audio programming to radio stations in networks. Routine processing power density requirements for these systems were originally established in Routine Licensing of Earth Stations in the 6 GHz and 14 GHz Bands Using Antennas Less than 9 Meters and 5 Meters in Diameter, Respectively, for Both Full Transponder and Narrowband Transmissions, *Declaratory Order*, 2 FCC Rcd 2149 (Com. Car. Bur. 1987).

dB, from 13 dBW/4 kHz²¹⁰ to 17 dBW/4 kHz. As Loral recommends, we have considered this rule revision carefully, and we conclude that this increase will not significantly increase the potential for harmful or unacceptable interference among adjacent satellite networks. This is because there are relatively few narrowband analog hub systems in operation today,²¹¹ and we expect the number of analog hub systems to decrease in the future as digital technology continues to replace analog technology in satellite networks.

95. Therefore, based on the analysis summarized in Appendix C, we adopt PanAmSat's proposal to increase the downlink EIRP density limit for Ku-band VSAT systems to 10 dBW/4kHz. We also increase the downlink EIRP density limit for analog narrowband hub-type systems to 17 dBW/4kHz.

b. Other Ku-band Earth Stations

96. *Background.* In addition to Ku-band VSAT networks, commenters propose an increase in "routine" power levels for other types of Ku-band downlink transmissions. Section 25.212(c) of our rules provides that Ku-band earth stations meeting a minimum size limit may be routinely licensed if the downlink EIRP density does not exceed +6.0 dBW/4 kHz for digital transmissions and +13.0 dBW / 4 kHz for narrowband analog transmissions.²¹²

97. Hughes argues that, given that the most common transponder bandwidth for Ku-band satellites is 36 MHz, with a peak EIRP in the range from 49 to 52 dBW, the maximum EIRP spectral density for single-carrier full transponder and dual-carrier full transponder transmissions allowed for routine processing could be increased from +6 dBW/4kHz to +13.0 dBW/4kHz.²¹³ Spacenet recommends increasing the routine satellite downlink EIRP limit for wideband digital carriers from +6.0 to +16.0 dBW/4kHz.²¹⁴ Hughes responds that the power level proposed by Spacenet would create unacceptable levels of interference.²¹⁵ SIA supports increasing EIRP density to 13 dBW/4 kHz, but only if the higher EIRP is coordinated with adjacent satellite operators.²¹⁶

²¹⁰ See 47 C.F.R. § 25.212(c).

²¹¹ We reviewed the earth station licenses on file in our database. Based on that review, we found that, as of October 1, 2004, of the 1657 licensed emissions authorizing operations in the 14.0-14.5 GHz band, none were authorized analog audio operations using bandwidths of 360 kHz or less. Similarly, of the 2804 licensed emissions authorizing operations in the 11.7-12.2 GHz band, none were authorized analog audio operations using bandwidths of 360 kHz or less. On the other hand, 1146 licensed emissions, or 69.2 percent, in the 14.0-14.5 GHz band, and 1439 or 43.9 percent in the 11.7-12.2 GHz band, were for digital operations.

²¹² 47 C.F.R. § 25.212(c).

²¹³ Hughes Comments at 16-17; Hughes Reply at 7.

²¹⁴ Spacenet Comments at 30-34 and Exhibits B and C, citing *Ku-band NGSO Order*, 16 FCC Rcd 4096; Spacenet Reply at 14.

²¹⁵ Hughes Reply at 8.

²¹⁶ SIA Further Comments at 25-26.

98. *Discussion.* We find that we can increase the Ku-band downlink EIRP density limit, but not to the extent that the Hughes and Spacenet propose. No commenter provided a link budget analysis or any other detailed technical data to support their proposals. Furthermore, analyzing the proposal to increase EIRP density for transmissions to 13.0 dBW/4 kHz or higher using the available 1986 data shows that most narrowband analog transmissions are likely to experience harmful interference.²¹⁷

99. Nevertheless, we conclude that we can increase the Ku-band downlink EIRP density limit from its current +6 dBW/4 kHz to 10 dBW/4 kHz. Based on our analysis of the VSAT downlink EIRP density increase as set forth in Appendix C, we find that increasing the EIRP density limit to 10 dBW/4 kHz will not cause an increase in harmful interference to other licensed operators. We also adopt rule revisions needed to implement this proposal, as set forth in Appendix B.

c. C-band Earth Stations

100. Currently, the Commission's rules do not specify a downlink EIRP limit for C-band earth station operations. New Skies agrees that there is no need for an absolute limit, but recommends adopting downlink EIRP guidelines for the C-band. New Skies notes that data submitted by GE Americom in 1983 showed that the satellites then in operation would not cause harmful interference into adjacent satellite systems if all the satellites in operation used downlink EIRP levels at C-band within 2 dB of each other. New Skies recommends a study to determine whether greater power level differences among adjacent satellites are now possible.²¹⁸ Telesat replies that the Commission has not found any need to adopt downlink EIRP guidelines for the C-band in the past, and asserts that there is no need for such guidelines now.²¹⁹

101. We will not adopt C-band downlink EIRP requirements or guidelines at this time. The record does not provide a basis for adopting any specific requirements or guidelines. Furthermore, we are not aware of any instances of harmful interference at C-band that might have been prevented by adopting requirements or guidelines. If New Skies submits a petition for rulemaking proposing specific rule revisions or guidelines, and provides a engineering study to support its recommendation, we will consider revisiting our conclusion.

3. Earth Station Uplink Power Levels

102. *Background.* Another method of controlling interference in a two-degree spacing environment is to limit the uplink power from the earth station. Section 25.211 contains uplink power limits for routine processing of both C-band and Ku-band earth stations transmitting video and "full transponder" services.²²⁰ Section 25.212 governs certain other transmissions, including

²¹⁷ See Appendix C.

²¹⁸ New Skies Comments at 3-5.

²¹⁹ Telesat Reply at 2-3.

²²⁰ Section 25.211(d) reads as follows: "In the [conventional C-band], an earth station with an equivalent diameter of 9 meters or smaller may be routinely licensed for transmission to full transponder services if the maximum power into the antenna does not exceed 450 watts (26.5 dBW). In the [conventional Ku-band], an earth station with an equivalent diameter of 5 meters or smaller may be routinely licensed for transmission of full transponder services if the maximum power into the antenna does

various combinations of "wideband" and "narrowband" analog and digital services at both C-band and Ku-band.²²¹ In the *Notice*, the Commission focused on the definitions of "wideband," "narrowband," and "full transponder" in Sections 25.211 and 25.212.²²² While the Commission proposed definitions for these terms,²²³ it also invited commenters to discuss whether it was still appropriate to use these terms.²²⁴ In their initial comments, parties generally recommended defining "wideband" as carriers greater than 3 to 5 MHz.²²⁵

103. In its *ex parte* statements, however, SIA suggested more extensive revisions to the uplink power rules in Sections 25.211 and 25.212. SIA recommends applying the power limits in Section 25.211 to *analog* video transmissions only, and moving the limits for digital video into Section 25.212.²²⁶ Section 25.212 would then apply to all digital transmissions, and would apply a single power level to both narrowband and wideband digital transmissions.²²⁷ SIA also recommends eliminating definitions of "narrowband" and "wideband." It states that "narrowband" is defined wherever it appears in Section 25.212, and that its proposed consolidation of all digital transmissions in Section 25.212 make a definition of "wideband" unnecessary.²²⁸ In addition, SIA requests us to clarify that the input power density limits in Section 25.212 apply to the input power spectral density into the transmitting antenna flange.²²⁹

not exceed 500 watts (27 dBW)." 47 C.F.R. § 25.211(d).

²²¹ Section 25.212(c) states: "In the [conventional Ku-band], an earth station with an equivalent diameter of 1.2 meters or greater may be routinely licensed for transmission of narrowband analog services with bandwidths up to 200 kHz if the maximum input power density into the antenna does not exceed -8 dBW/4 kHz and the maximum transmitted satellite carrier EIRP density does not exceed 13 dBW/4 kHz, and for transmission of narrowband and/or wideband digital services, if the maximum input power density into the antenna does not exceed -14 dBW/4 kHz and the maximum transmitted satellite carrier EIRP density does not exceed +6.0 dBW/4 kHz." 47 C.F.R. § 25.212(c). Section 25.212(d) states: "In the [conventional C-band], an earth station with an equivalent diameter of 4.5 meters or greater may be routinely licensed for transmission of SCPC services if the maximum power densities into the antenna do not exceed +0.5 dBW/4 kHz for analog SCPC carriers with bandwidths up to 200 kHz, and do not exceed -2.7 dBW/4 kHz for narrow and/or wideband digital SCPC carriers." 47 C.F.R. § 25.212(d).

²²² *Notice*, 15 FCC Rcd at 25143 (para. 41). In addition to the uplink power limits in Sections 25.211 and 25.212, Section 25.134 includes routine power levels for digital and analog uplink Ku-band VSAT systems.

²²³ *Notice*, 15 FCC Rcd at 25185 (App. B, proposed Section 25.201(b)(41)).

²²⁴ *Notice*, 15 FCC Rcd at 25143 (para. 41).

²²⁵ *See Further Notice*, 17 FCC Rcd at 18634-35 (para. 134), and pleadings cited therein.

²²⁶ SIA December 10, 2001 *Ex Parte* Statement at 24, *cited in Further Notice*, 17 FCC Rcd at 18634 (para. 133).

²²⁷ SIA December 10, 2001 *Ex Parte* Statement at 24, *cited in Further Notice*, 17 FCC Rcd at 18634 (para. 133).

²²⁸ SIA December 10, 2001 *Ex Parte* Statement at 27. SIA also proposed revisions to Section 25.212 that parallel its proposed revisions to the standards for routine and non-routine earth station applications it proposed for Section 25.209. SIA December 10, 2001 *Ex Parte* Statement, App. at 16-17. We will address SIA's proposed revisions to Sections 25.209 and 25.212 in the *Sixth Report and Order* in this proceeding.

104. The Commission invited comment on SIA's proposals in the *Further Notice*.²³⁰ In particular, the Commission observed that it may be reasonable to treat analog video transmissions separately from other transmissions because those transmissions are more susceptible to harmful interference from other transmissions and more likely to cause harmful interference to other transmissions.²³¹ The Commission also asked for comment on whether it should define input power limits to the earth station antenna in terms of power spectral density into the antenna flange.²³²

105. *Discussion.* In its further comments, SIA continues to recommend that the power limits of Section 25.211 apply only to analog video transmissions, and that digital video transmissions be subject to the power limits of Section 25.212.²³³ No one else commented on this issue.

106. We agree with SIA that we should treat analog video transmissions separately from other transmissions, and that the appropriate powers are those contained in Section 25.211. As the Commission explained in the *Further Notice*, analog video transmissions should be treated separately from other transmissions because they are more susceptible to harmful interference from other transmissions and more likely to cause harmful interference to other transmissions.²³⁴ Moreover, while Sections 25.211(a) through (c) explicitly apply only to analog video transmissions, Section 25.211(d) applies to both digital and analog full transponder services. Accordingly, by amending Section 25.211(d) to make it explicit that it applies only to full transponder analog video services in the C-band or the Ku-band, we make our treatment of full transponder analog services consistent with other analog services, and our treatment of full transponder digital services consistent with other digital services. With respect to SIA's recommendation to make digital video transmissions subject to Section 25.212, we note that Sections 25.212(c) and (d) provide power limits for "narrowband and/or wideband digital

²²⁹ SIA December 10, 2001 *Ex Parte* Statement at 24, cited in *Further Notice*, 17 FCC Rcd at 18634 (para. 133). The antenna flange is the radiofrequency connector at the input to the antenna.

²³⁰ *Further Notice*, 17 FCC Rcd at 18635 (paras. 136-37).

²³¹ *Further Notice*, 17 FCC Rcd at 18635 (para. 136), citing Amendment of Part 25 of the Commission's Rules and Regulations to Reduce Alien Carrier Interference Between Fixed-Satellites at Reduced Orbital Spacings and to Revise Application Processing Procedures for Satellite Communications Services, *Second Report and Order and Further Notice of Proposed Rulemaking*, CC Docket No. 86-496, 8 FCC Rcd 1316, 1320 (para. 24) (1993) (*Ku-band Antenna Gain Pattern Revision Order*). In that Order, the Commission adopted revisions to several technical rules intended to help implement 2° orbital spacing, in addition to revising the Ku-band earth station antenna gain pattern. The Commission also sought comment on revising the temporary fixed earth station rules. We discuss that proposal in Section IV.C.3. When we refer to that part of the document, we will refer to it as the *Temporary-Fixed Further NPRM*.

²³² *Further Notice*, 17 FCC Rcd at 18635-36 (paras. 136-37). The antenna flange is the radio frequency connector at the input to the antenna.

²³³ SIA Further Comments at 24.

²³⁴ *Further Notice*, 17 FCC Rcd at 18635 (para. 136).

services" for the Ku-band and C-band, respectively.²³⁵ The wideband digital services referred to in Sections 25.212(c) and (d) include digital video transmissions, and so Section 25.212 already applies to digital video transmissions. Moreover, we agree with SIA that these revisions to Sections 25.211 and 25.212 make our proposed definitions for "narrowband" and "wideband" unnecessary, because the same power requirements will apply to both narrowband and wideband digital transmissions. Therefore, we need not address this issue further.

107. We also agree with SIA that the phrase "input power spectral density to the antenna flange" is more precise than the language currently in Section 25.212(c). The term "flange," however, implies a particular implementation hardware, which is very common, but not necessarily unique.²³⁶ Accordingly, we will not include the word "flange" in Section 25.212(c), and instead use the phrase "input power spectral density to the antenna." As a logical outgrowth of SIA's proposal, we also revise Section 25.134 to include the phrase "input power spectral density to the antenna" for VSAT systems.

4. Industry Working Group

108. GE Americom and SIA recommend allowing an industry working group to review all the Commission's current C-band and Ku-band earth station power limits, similar to the working group that developed Ka-band standards.²³⁷ Subsequently, SIA formed a working group that made several recommendations, including the increase in Ku-band downlink EIRP density we adopt above. The Industry is free to form an industry working group on a voluntary basis. However, we will not mandate the formation of any such group. If that working group develops recommendations for earth station power level revisions or guidelines, it may file a petition for rulemaking requesting the Commission to codify those revisions or guidelines. We will determine whether a rulemaking is warranted when or if such a petition is filed.

C. Temporary Fixed Earth Stations

1. Immediate Operation at Ku-band

109. In the *Notice*, we proposed allowing operators of "routine" temporary fixed earth stations in the Ku-band to begin operation immediately upon placement of the application on public notice, rather than waiting for license grant.²³⁸ "Routine" temporary fixed earth stations

²³⁵ 47 C.F.R. §§ 25.212(c), (d).

²³⁶ For example, small earth station antennas may use a coaxial cable connector, if the route between the amplifier and the antenna is relatively short and if there is power to spare. Also, broadband over satellite applications may use an integrated feed/amplifier module where the coupling of the amplifier to the antenna is internal to the module, is inaccessible from the outside, and may consist of a printed pattern on a ceramic chip. In this case, the connection to the feed/amplifier module would be through a coaxial connector, but the power level at this interface would not provide a direct measure of the antenna input power density.

²³⁷ GE Americom Comments at 3-4; SIA Reply at 2-4.

²³⁸ *Notice*, 15 FCC Rcd at 25143 (para. 42), 25181-82 (App. B, proposed Section 25.151(e)). The *Notice* limited this proposal to temporary fixed earth stations rather than all FSS earth stations. This limitation is reasonable because temporary fixed earth station operators are often newsgathering organizations that need to begin operations quickly.

are those intended to operate only in the conventional Ku-band and seeking authority to communicate only with U.S.-licensed satellites and non-U.S.-licensed satellites on the Permitted List, and that meet the antenna size and power limits in Part 25.²³⁹ We also suggested limiting this immediate operating authority to applications filed electronically.²⁴⁰ Finally, we tentatively concluded that Section 309(b)(2) of the Communications Act does not require a 30-day public notice period for this narrow class of temporary fixed earth station applications.²⁴¹

110. PanAmSat argues that the automatic authority should not take effect until after the 30-day notice period, so that any issues that may arise could be resolved before operations begin.²⁴² Spacenet, on the other hand, supports the Commission's proposal to allow routine temporary fixed earth stations to begin operation immediately upon public notice.²⁴³

111. We adopt the proposal in the *Notice*. "Routine" Ku-band temporary-fixed earth stations should not cause harmful interference into other satellite systems. Further, the band is allocated to the fixed-satellite service on a primary basis, which means that satellite services are protected against interference from other services. In the year ending October 1, 2004, no one filed any oppositions that persuaded us to deny any of the 27 routine Ku-band temporary-fixed earth station applications filed that year. Any earth station operator that causes harmful interference during this 30-day period may be subject to forfeiture penalties.²⁴⁴ In addition, if any objection is filed, we reserve the right to require the operator to terminate operations.²⁴⁵

2. Other Frequency Bands

112. We also invited proposals for streamlining applications for temporary fixed earth stations in frequency bands other than the conventional Ku-band.²⁴⁶ None of the commenters made any proposals. Accordingly, we limit these streamlined procedures to temporary-fixed conventional Ku-band applications as specified above.

²³⁹ *Notice*, 15 FCC Rcd at 25143 (para. 42), 25181-82 (App. B, proposed Section 25.151(e)). As noted above, the conventional Ku-band is the 14.0-14.5 GHz and 11.7-12.2 GHz band.

²⁴⁰ *Notice*, 15 FCC Rcd at 25143 (para. 42), 25181-82 (App. B, proposed Section 25.151(e)).

²⁴¹ *Notice*, 15 FCC Rcd at 25143 (para. 42), citing 47 U.S.C. § 309(b)(2).

²⁴² PanAmSat Comments at 11. *See also* SIA Reply at 6.

²⁴³ Spacenet Comments at 44.

²⁴⁴ *See* 47 C.F.R. § 25.273(a)(3) (no one may transmit in any manner that causes unacceptable interference to the authorized transmission of another licensee); 47 C.F.R. § 1.80(a)(2) (violators of Commission rules may be subject to forfeiture liability).

²⁴⁵ Section 25.277(e) of the Commission's rules, 47 C.F.R. § 25.277(e), requires temporary-fixed earth station operators to cease operations upon notification of harmful interference.

²⁴⁶ We emphasized that we were not contemplating revision of the process for coordinating temporary fixed earth stations and terrestrial operations in shared bands, but rather inviting proposals for streamlining the licensing of such earth stations once coordination was complete. *Notice*, 15 FCC Rcd at 25143 (para. 43).

3. Testing

113. In the *Temporary-Fixed Further NPRM*, the Commission invited comment on testing requirements for temporary-fixed earth stations.²⁴⁷ Interested parties filed comments in 1993. We find that the record on this issue is now stale. We find further that, in light of the subsequent operation of temporary-fixed earth stations since 1993 without reported cases of harmful interference, testing requirements have proven unnecessary. Accordingly, we decide not to adopt any testing requirements for temporary-fixed earth stations and terminate that proceeding.

D. Mobile Earth Station Networks

1. One-year Construction Completion Requirement

114. Section 25.133(a) of the Commission's rules requires each earth station licensee to complete construction of its earth station within one year of the date the license is granted.²⁴⁸ This includes all earth stations covered by a "blanket" earth station license. Rather than individually licensing each technically identical antenna operating as a network, the Commission often issues blanket licenses covering a specified number of earth stations. In the *Notice*, the Commission questioned whether it is necessary to require licensees holding blanket licenses for multiple satellite mobile earth station terminals (METs) to construct all the METs authorized within a year of the grant of the license, provided that a reasonable number of METs have been constructed and the licensee has started to offer service within a year.²⁴⁹ Therefore, we proposed revising Section 25.133(a) to require MET licensees only to bring their networks of earth stations into operation within a year, without specifying the number of stations required to be operational.²⁵⁰ We also proposed revising Section 25.133(b) of our rules to require MET licensees to certify that they have brought their networks into operation within a year of receiving their licenses.²⁵¹

115. Commenters generally support these proposals. Motient notes that most MET licensees request authority for enough METs to enable their businesses to grow for several years, and asserts that it is burdensome for licensees to construct all those terminals in the first year of the license term.²⁵² On the other hand, SIA questions whether there should be any requirements to bring any METs into use within a year.²⁵³ As proposed in the *Notice*, we revise Section

²⁴⁷ *Temporary-Fixed Further NPRM*, 8 FCC Rcd at 1325-27 (paras. 56-64).

²⁴⁸ 47 C.F.R. § 25.133(a), cited in *Notice*, 15 FCC Rcd at 25144 (para. 46).

²⁴⁹ *Notice*, 15 FCC Rcd at 25144 (para. 46), citing *1996 Streamlining Order*, 11 FCC Rcd at 21592 (para. 26) (noting that the Commission had previously relaxed the requirement that VSAT operators construct their networks within four years).

²⁵⁰ *Notice*, 15 FCC Rcd at 25144 (para. 46).

²⁵¹ *Notice*, 15 FCC Rcd at 25144 (para. 46).

²⁵² Motient Comments at 3. See also Astrolink Comments at 5; CMDC Reply at 2.

²⁵³ SIA nevertheless agrees that the Commission's proposed rule is preferable to requiring that all METs covered by a blanket license be brought into use within a year. SIA March 23, 2004 *Ex Parte* Statement at 4.

25.133(a) to require MET licensees only to bring their networks of earth stations into operation within a year. We also revise Section 25.133(b) to require MET licensees to certify that they have brought their networks of earth stations into operation within a year of receiving their licenses. The Commission's rules prohibit licensees from taking their earth stations out of operation for more than 90 days.²⁵⁴ The rules also provide for eliminating protection from interference in cases where a licensee has used its station less than 50 percent of the time in any 12-month period.²⁵⁵ This furthers the public interest by encouraging licensees to provide the services they said they would provide in their license applications. For the same reason, we find that it is reasonable to require MET licensees to report to the Commission whether they have brought their networks into use within 12 months.

116. Astrolink recommends extending this relief to Ka-band blanket earth station licenses.²⁵⁶ In contrast to METs, Ka-band earth stations operate in the Fixed-Satellite Service. We conclude that it is similarly burdensome to require Ka-band blanket earth station licensees to construct all the licensed terminals in the first year of the license term. For the same reason, we include Ku-band blanket earth station licenses, including VSAT licenses. We revise Sections 25.133(a) and (b) accordingly.

2. Bring-Into-Use Requirements

117. *Background.* In the Notice, the Commission also invited comment on whether MET licensees should be required to bring a certain percentage of their authorized terminals into use within a certain time after they receive their licenses. The Commission also asked what percentage would be reasonable, and what time period would be appropriate.²⁵⁷

118. *Discussion.* Globalstar opposes any requirement to bring a certain percentage of terminals into use by a certain time. Globalstar and CMDC criticize the Commission for not proposing any specific milestone schedule in the Notice.²⁵⁸ Astrolink argues that MET licensees should be allowed to bring terminals into use in response to marketplace forces rather than a Commission-imposed milestone schedule.²⁵⁹ Globalstar also argues that marketing considerations may justify postponement of the rollout of a particular MET.²⁶⁰ The number of terminals that a MET licensee is authorized to build does not affect other licensees' ability to implement their systems. Thus, there are no warehousing issues. Therefore, we agree that MET

²⁵⁴ 47 C.F.R. § 25.161(c).

²⁵⁵ 47 C.F.R. § 25.162(c).

²⁵⁶ Astrolink Comments at 5-6. *See also* Hughes Reply at 18-19 (arguing that the Commission allowed Ka-band blanket earth station licensees to build out their systems over the life of the license when it decided to make the terms of such blanket licenses coincide with space station licenses, and requesting clarification of this issue); SIA Reply at 11.

²⁵⁷ Notice, 15 FCC Rcd at 25144 (para. 47).

²⁵⁸ Globalstar Comments at 5; CMDC Reply at 2-3. *See also* SIA Reply at 10-11.

²⁵⁹ Astrolink Comments at 8. *See also* SIA March 23, 2004 *Ex Parte* Statement at 4-5.

²⁶⁰ Globalstar Comments at 4.

licensees should be allowed to bring terminals into use in response to marketplace forces rather than a Commission-imposed milestone schedule.

3. Terminal Reporting Requirement

119. The *Notice* invited interested parties to discuss whether there is any need to review the number of mobile earth station terminals brought into operation at various points in the license term.²⁶¹ For example, should MET licensees be required to file periodic reports stating the number of terminals in use?²⁶²

120. Astrolink and CMDC argue that reporting requirements are not necessary because METs use exclusive satellite spectrum, and operate with an individual satellite under strict service rules, and so the number of METs in operation does not affect the interference environment or intra-system sharing.²⁶³ Globalstar and Astrolink oppose a periodic reporting requirement, claiming that the number of terminals in use is competitively sensitive.²⁶⁴ We agree that such MET reporting requirements are unnecessary.²⁶⁵

121. Astrolink requests us to eliminate the annual Ka-band earth station reporting requirement in Section 25.145(g)(2).²⁶⁶ We will not eliminate this reporting requirement for Ka-band licensees at this time. Section 25.145(g)(2) requires Ka-band earth station blanket license holders to report the number of earth stations brought into service, so that the Commission can monitor the development of the service.²⁶⁷ The Commission anticipated streamlining this procedure at some point in the future, once the service has matured sufficiently that monitoring

²⁶¹ *Notice*, 15 FCC Rcd at 25144 (para. 47).

²⁶² *Notice*, 15 FCC Rcd at 25144 (para. 47).

²⁶³ Astrolink Comments at 7; CMDC Reply at 3. *See also* SIA Reply at 8-9; SIA March 23, 2004 *Ex Parte* Statement at 4-5.

²⁶⁴ Globalstar Comments at 5; Astrolink Comments at 7. *See also* SIA Reply at 10-11.

²⁶⁵ Although we have decided not to adopt a generally applicable MET reporting requirement in this Order, our decision here does not affect the MET reporting requirement we adopted for MSS licensees who are authorized to integrate ancillary terrestrial components (ATCs) into their MSS networks. ATC licensees in the L-band are required to report the number of METs in their networks annually because they are limited to 90,000 simultaneously transmitting terminals. Flexibility for Delivery of Communications by Mobile Satellite Service Providers in the 2 GHz Band, the L-Band, and the 1.6/2.4 GHz Bands; Review of the Spectrum Sharing Plan Among Non-Geostationary Satellite Orbit Mobile Satellite Service Systems in the 1.6/2.4 GHz Bands, *Report and Order and Notice of Proposed Rulemaking*, IB Docket Nos. 01-185 and 02-364, 18 FCC Rcd 1962, 2054-55 (para. 188) (2003).

²⁶⁶ Astrolink Comments at 7. Astrolink alternatively requests that we allow licensees to submit that information on a confidential basis. Astrolink Comments at 7. Licensees are always allowed to submit information under a request for confidentiality under Section 0.459 of the Commission's rules, 47 C.F.R. § 0.459. In the event that a licensee files such a request, we would evaluate it at the time a party files a request to inspect that information under the Freedom of Information Act (FOIA) and Section 0.461 of the Commission's rules, 47 C.F.R. § 0.461.

²⁶⁷ *18 GHz Band Report and Order*, 15 FCC Rcd at 13472 (para. 88).

growth on an annual basis is no longer necessary,²⁶⁸ but there is nothing in the record to show that this service has reached that level of maturity.

4. License Renewals

122. The Commission solicited comment on renewing blanket MET and VSAT licenses only for those earth stations that have been brought into operation if the licensee has not brought all the earth stations permitted by its license into operation at the time of renewal.²⁶⁹ Globalstar and Motient oppose this as a restriction on the flexibility of MET licenses.²⁷⁰ Globalstar and Astrolink argue that, under this proposal, the licensee would have to file an amendment as soon as it wanted to add another terminal to its network.²⁷¹ Hughes asserts that this requirement is burdensome and unnecessary for VSAT licensees.²⁷² We agree that it could be unnecessarily burdensome to limit renewals for blanket licensees in this way, and will not adopt this proposal.

5. Other MET Issues

123. Globalstar requests us to clarify that METs are distinct from the NGSO MSS service provider's gateway earth station network, and that multiple entities may obtain separate MET authorizations with the same MSS satellite system.²⁷³ SIA requests that we clarify that the term "network" in the context of the MET issues we discuss above means the METs authorized under the blanket license rather than a combination of those METs and space stations or gateway earth stations.²⁷⁴ Both SIA and Globalstar are correct. The rule revisions we adopt here apply only to the METs themselves, and not to the satellites communicating with those METs, or to gateway earth stations.

V. VSAT LICENSING ISSUES

A. Background

124. The Commission's rules permit parties to obtain a license for a large number of technically identical small aperture antenna earth stations. These networks are referred to as very small antenna terminal (VSAT) networks. VSATs are generally comprised of a hub station transmitting to a satellite, which then transmits the signal to multiple technically identical remote small aperture antennas.²⁷⁵ The remote antennas can also transmit to the satellite, which then

²⁶⁸ 18 GHz Band Report and Order, 15 FCC Rcd at 13472 n.178.

²⁶⁹ Notice, 15 FCC Rcd at 25144 (para. 46).

²⁷⁰ Motient Comments at 4; Globalstar Comments at 4.

²⁷¹ Astrolink Comments at 6-7; Globalstar Comments at 4-5. See also CMDC Reply at 2; SIA Reply at 9-10.

²⁷² Hughes Comments at 28. See also SIA Reply at 16-17; Spacenet Reply at 23-25, SIA December 10, 2001 *Ex Parte* Statement at 31-32; ; SIA March 23, 2004 *Ex Parte* Statement at 5-6.

²⁷³ Globalstar Comments at 3-4.

²⁷⁴ SIA Reply at 7 n.15.

²⁷⁵ Notice, 15 FCC Rcd at 25145 (para. 50), citing Routine Licensing of Large Networks of

retransmits the signal to the hub station. In many networks, the hub earth station controls the remote earth stations. VSAT networks were originally permitted only in the Ku-band,²⁷⁶ but have since been allowed in the C-band and Ka-band.²⁷⁷ The Commission solicited comment on a number of VSAT issues in the *Notice* and the *Further Notice*.²⁷⁸ We address those issues below.

B. Multiple Hub Stations

125. In the *Notice*, we proposed revising Section 25.134 so that it explicitly permits multiple hub stations under a single VSAT network license.²⁷⁹ We noted that a second hub station could be used as a backup to the primary hub station.²⁸⁰ We also observed that multiple hub stations could promote provision of Internet service, by allowing distribution of network traffic to various traffic switching and control centers.²⁸¹ WorldCom and Spacenet support this proposal,²⁸² and no one opposed it. Accordingly, we revise Section 25.134 to allow multiple hub stations under a single VSAT network license, for all the reasons set forth in the *Notice*.²⁸³

126. The National Radio Astronomy Observatory (NRAO), however, recommends placing a limitation on multiple-hub VSAT networks. NRAO observes that Section 25.203(f) establishes a "Quiet Zone" for radio astronomy in a 13,000 square mile area in Virginia, West Virginia, and Maryland.²⁸⁴ Under Section 25.203(f), anyone seeking a license in that area must notify the NRAO.²⁸⁵ NRAO is given 20 days to file an objection to the proposed operations with

Small Antenna Earth Stations Operating in the 12/14 GHz Frequency Bands, 51 Fed. Reg. 15067 (Apr. 22, 1986) (*1986 VSAT Order*); 47 C.F.R. §25.134(a).

²⁷⁶ See *Notice*, 15 FCC Rcd at 25145 (para. 50).

²⁷⁷ See FWCC Request for Declaratory Ruling on Partial-Band Licensing of Earth Stations in the Fixed-Satellite Service that Share Terrestrial Spectrum, *First Report and Order*, IB Docket No. 00-203, 16 FCC Rcd 11511 (2001) (*FWCC/Onsat First Report and Order*). Redesignation of the 17.7-19.7 GHz Frequency Band, Blanket Licensing of Satellite Earth Stations in the 17.7-20.2 GHz and 27.5-30.0 GHz Frequency Bands, and the Allocation of Additional Spectrum in the 17.3-17.8 GHz and 24.75-25.25 GHz Frequency Bands for Broadcast Satellite-Service Use, *Report and Order*, IB Docket No. 98-172, 15 FCC Rcd 13430 (2000).

²⁷⁸ *Notice*, 15 FCC Rcd at 25148-50 (paras. 58-66); *Further Notice*, 17 FCC Rcd at 18622 (paras. 98-100).

²⁷⁹ *Notice*, 15 FCC Rcd at 25148 (paras. 58-59).

²⁸⁰ *Notice*, 15 FCC Rcd at 25148 (para. 58).

²⁸¹ *Notice*, 15 FCC Rcd at 25148 (para. 58).

²⁸² WorldCom Comments at 3; Spacenet Comments at 46. See also PanAmSat Comments at 11 (PanAmSat supports the proposal, provided that the location and operating parameters of all the hubs are specified in the application); SIA Reply at 17.

²⁸³ *Notice*, 15 FCC Rcd at 25148 (para. 58).

²⁸⁴ The Quiet Zone is an area bounded by 39° 15' N.L., 78° 30' W.L., 37° 30' N.L., and 80° W.L. See 47 C.F.R. § 25.203(f).

²⁸⁵ NRAO Reply at 1-2, citing 47 C.F.R. § 25.203(f); Amendment of Part 2 of the